Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Orbit and Mass of the Variable Star *Algol (β Persei).*

On the 28th of November a very important discovery was communicated to the Academy of Sciences of Berlin by Professor H. C. Vogel, Director, and Dr. Scheiner, Astronomer of the Astrophysikalisches Observatorium of Potsdam. I condense from the *Sitzungsberichte* of the Academy, 1889, (page 1045), the following :—

"Three photographic negatives of the spectrum of *Algol* taken during the winter of 1888-9 showed that before a minimum *Algol* was moving away from the sun, and after a minimum it was moving towards it. Three new exposures of November, 1889, confirm this result. The observations taken together afford a very strong support to the theory that the cause of the variations in the light of *Algol* is to be found in the eclipses of this star by a dark (invisible) satellite revolving about it. The phenomena can be explained by assuming the following particulars of the dimensions of the two bodies :—

" Diameter of *Algol* . . . . . = 230,000 geographical miles.
" Diameter of the invisible satellite = 180,000 " "
" Distance between their centres . = 700,000 " "
" Satellite's velocity in orbit . . = 12.0 " "
" Mass of *Algol* . . . . . . = $\frac{4}{9}$ of the Sun's mass.
" Mass of the satellite = $\frac{2}{9}$ " " "
" Motion of both bodies in the line of sight (toward the Sun) 0.5 geographical miles."

E. S. H.

Programme for Meridian Observations of Stars.

When the Repsold meridian circle was ordered, it was designed to use it in determination of the absolute positions of the fundamental stars. Experiments during 1888 and 1889 showed Professor Schaeberle (in charge of the circle) and myself that observations during the daytime were not at all comparable in precision with night observations. It is very rare to find the images in the daytime steady enough to deserve weight 2 (5 = perfectly steady, 1 extremely unsteady), while there are very many nights of weight 4 and weight 5 during the fair season (May to November). The Sun, *Mercury* and *Venus* were often observed at transit during 1889, and the images were always found to be of weight 1, or less. For this reason we reluctantly decided to abandon the plan of referring star places in Right Ascension to the Sun, either directly or through *Mercury* and *Venus.*

All our R. A. observations must then be differential.

The work next in importance seemed to be the observation of all the stars of the English, the French and the American Nautical Almanacs which are visible at Mount Hamilton and which are *not* included in the star-list of the *Berliner Jahrbuch.* There are 127 such stars. If each were referred to the *B. J.* system, we should be far on the way towards making all meridian observations in the northern hemisphere homogeneous, and the extension of the *B. J.* system to the southern hemisphere would be much facilitated. Accordingly a plan was prepared for doing this work and was submitted to Professor AUWERS, who was kind enough to give us the benefit of his counsel. The programme adopted for this part of the work is, in brief, as follows:

The only *B. J.* stars observed will be the nine polars (U. C. and L. C.) and ninety-six stars of the *B. J.* between + 15° and — 10°, together with three other stars slightly beyond these limits. The ninety-nine clock stars are as follows:—

3	47	91	120	151	449	216	266	309
339	53	97	123	432	179	222	269	519
342	56	100	124	434	183	227	495	522
15	550*	102	128	160	186	597*	274	317
21	67	382	131	438	191	233	277	320
349	366	386	134	165	196	237	283	326
29	74	108	138	167	197	241	287	329
35	75	392	141	170	463	245	290	330
37	78	114*	572	172	200	250	297	534
39	84	118	423	174	468*	254	304	333
46	87	569	146	176	212	257	307	336

By this programme the determination of systematic errors is made easy. Each of the ninety-nine clock stars will be observed at least

3 nights direct clamp west.
3 " " " east.
3 " reflected " west.
3 " " " east.

No other stars, except these and the four close circumpolars, will be regularly observed reflected. Each of the 127 stars from the various Almanacs (and not in the *B. J.*) will be observed at least

---

* The four stars 550, 114, 468, 597 are just outside the zone + 15° to — 10°.

6 nights direct clamp west.
6 " " " east.

The declination will be referred to the nadir.

Refraction Stars.

Professor SCHAEBERLE and myself have selected two lists of stars for the determination of the refraction; the northern list contains ninety-three stars north of Z. D. 42° and the southern list contains one hundred and ten stars south of Z. D. 40° as follows:

NORTHERN REFRACTION STARS.
(FROM THE *B. J.*)

NOS.	NOS.	NOS.	NOS.	NOS.	NOS.
169 L. C.	226 L. C.	291 L. C.	5 L. C.	369 L. C.	508
171 L. C.	477 L. C.	504 L. C.	340 L. C.	371 L. C.	415 L. C.
447 L. C.	235 L. C.	508 L. C.	344 L. C.	235	137 L. C.
344	236 L. C.	306 L. C.	19 L. C.	373 L. C.	418 L. C.
19	242 L. C.	137	20 L. C.	92 L. C.	143 L. C.
178 L. C.	484 L. C.	308 L. C.	347 L. C.	379 L. C.	425 L. C.
453 L. C.	485 L. C.	515 L. C.	26 L. C.	388 L. C.	150 L. C.
455 L. C.	256 L. C.	520 L. C.	350 L. C.	490	428 L. C.
184 L. C.	490 L. C.	521 L. C.	459	391 L. C.	154 L. C.
459 L. C.	111	425	38 L. C.	111 L. C.	436 L. C.
462 L. C.	265 L. C.	325 L. C.	43 L. C.	397 L. C.	334
198 L. C.	271 L. C.	529 L. C.	360 L. C.	116 L. C.	439 L. C.
467 L. C.	497 L. C.	530 L. C.	361 L. C.	497	440 L. C.
470 L. C.	284 L. C.	533 L. C.	364 L. C.	284	....
220 L. C.	282 L. C.	537 L. C.	217	406 L. C.	....
68	502 L. C.	168	68 L. C.	125 L. C.	....

SOUTHERN REFRACTION STARS.

STAR.	R. A. 1890.		STAR.	R. A. 1890.	
	H.	M.		H.	M.
ε Phœnix	0	04	ξ^2 Canis Major	6	30
κ^2 Sculptor	0	05	ν Puppis	6	34
ι “	0	16	α Canis Major	6	40
α Phœnix	0	21	κ “	6	45
β Cetus	0	38	ε “	6	53
α Sculptor	0	53	π Puppis	7	13
β Phœnix	1	01	25 Monoceros	7	32
γ “	1	24	f Puppis	7	33
ε Sculptor	1	40	l “	7	38
δ Cetus	1	46	ι Navis	8	03
μ Fornax	2	08	γ Argo	8	06
χ Eridanus	2	23	Br. 1197	8	20
π Cetus	2	39	α Pyxis	8	39
β Fornax	2	44	λ Vela	9	04
12 Eridanus	3	07	λ Pyxis	9	18
ε “	3	15	α Hydra	9	22
y “	3	33	ψ Vela	9	26
γ “	3	53	6 Sextans	9	46
o^1 “	4	06	λ Hydra	10	05
x “	4	14	q Vela	10	10
υ^1 “	4	28	α Antlia	10	22
α Cælum	4	37	p Vela	10	33
Ll. 9542	4	57	δ Crater	11	14
η Pictor	5	02	ξ Hydra	11	28
α Lepus	5	28	Centaurus	11	41
α Columba	5	36	β Hydra	11	47
κ Orion	5	42	ε Corvus	12	05
ξ Canis Major	6	16	δ “	12	24

	H.	M.
Lac. 5225	12	31
γ Centaurus	12	35
ξ_2 “	13	00
θ Virgo	13	04
γ Hydra	13	13
ι Centaurus	13	14
i “	13	38
μ “	13	43
π Hydra	13	59
θ Centaurus	14	00
κ Virgo	14	07
κ Centaurus	14	52
γ Scorpius	14	58
γ Libra	15	29
ψ^1 Lupus	15	33
χ “	15	43
δ Scorpius	15	54
γ_2 Norma	16	12
α Scorpius	16	23
τ “	16	29
ζ Ophiuchus	16	31
ε Scorpius	16	43
θ Ophiuchus	17	15
ζ Scorpius	17	31
κ “	17	35
γ Sagittarius	17	59
μ Sagittarius	18	07
ε Sagittarius	18	17
ξ Telescopium	18	20
σ Sagittarius	18	48
ζ “	18	55
λ Aquila	19	00
α Sagittarius	19	16
h “	19	30
c “	19	55
α^2 Capricornus	20	12
κ Sagittarius	20	15
ν Capricornus	20	34
ω “	20	44
ζ Microscopium	20	56
ν Aquarius	21	04
γ Capricornus	21	34
ι Piscis Austrinus	21	38
γ Grus	21	47
η Piscis Austrinus	21	53
α Grus	22	01
θ Aquarius	22	11
δ Grus	22	23
ε Piscis Austrinus	22	34
α “	22	52
c^2 Aquarius	23	04
β Sculptor	23	27
ε Phœnix	23	29
δ Sculptor	23	43

The declinations (only) of these stars will be observed as follows: Each star, at least

3 nights direct clamp west.
3 “ “ “ east.

Miscellaneous Stars.

A list of miscellaneous stars will be observed, each star twice. The Observatory will be glad to place any comparison stars needing determination on this list, and to observe and publish in due time. We cannot, however, undertake to make and publish such observations very promptly, as the stars of the other list take precedence, and as there is only one observer for the meridian circle.

The latitude of the Observatory will be determined from the four circumpolars, and also by TALLCOTT's method and by prime vertical transits.

A determination of the telegraphic longitude has just been published by the U. S. Coast and Geodetic Survey (*Bulletin* No. 13, 1889). The longitude is $8^h\ 06^m\ 34^s.81 \pm 0^s.1$.

All important stars will be observed (both direct and reflex) through wire screens, so as to reduce their magnitudes to a magnitude between 4 and 6. A reversing prism will be used for stars and nadirs as necessary. At least four nadirs per observing-night will be taken, as well as four determinations of level over mercury, four by the hanging level, one collimation, and one flexure for the present, at least. The division errors of the fixed circle will be determined and the declinations will also be read on the movable circle which is changed 1° every day. Thus the declination of every star observed twelve times should depend on forty-eight division lines of the movable circle and on four lines of the fixed circle.

A *mire* eighty feet distant is read at short intervals. Observations already made and reduced show the excellence of the circle as a whole. The precision of the positions has been materially increased by detaching the clamp-arm from the piers and using the instrument hanging freely in the Y's, as suggested by Professor SCHAEBERLE.

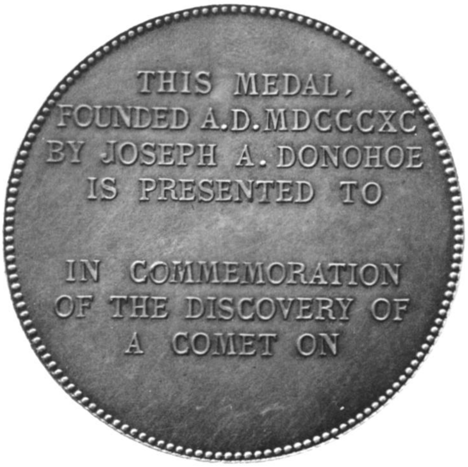
Experiments with the photographic lens of the great telescope will be undertaken to see if differences of declination, etc., can be carried with advantage from plate to plate between pairs of standard stars.

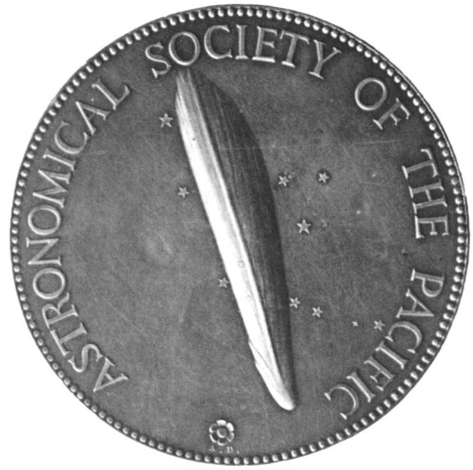
E. S. H.

SOLAR ECLIPSE OF DECEMBER 21, 1889.

The meagre accounts so far received indicate that the African expeditions have failed, on account of cloudy weather. The Lick Observatory party was successful. No account has been received from the other South American parties. E. S. H.

January 16, 1890.


THIS MEDAL,
FOUNDED A.D. MDCCCXC
BY JOSEPH A. DONOHOE
IS PRESENTED TO
IN COMMEMORATION
OF THE DISCOVERY OF
A COMMET ON


ASTRONOMICAL SOCIETY OF THE PACIFIC
A.D.